

## **REMARKS**

In the Office Action dated October 17, 2008, the Examiner rejected all pending claims: 7-8, 10-15, 20-26, 28-31, 33, 35-38, and 40-41. Claims 1-18, 22-25, 28-30, and 34-39 were rejected under 35 U.S.C. 101 as directed to nonstatutory subject matter and failing to produce a tangible effect. Claims 7-8, 10-15, 22-26, 28-31, 33, and 35-38 were also rejected under 35 U.S.C. 101 as lacking sufficient ties to a machine, article of manufacture, or a composition of matter. Claims 7-8, 10-15, 20-26, 28-31, 33, 35-38, and 40-41 were rejected under 35 U.S.C. 112, first paragraph as lacking enablement. Claims 7-8, 10, 12-13, 20-26, 28-31, 33, and 40 were rejected under 35 U.S.C. 103(a) as unpatentable over U.S. Patent 6,018,617 referred to hereafter as Sweitzer in view of U.S. Patent 5,597,312 referred to hereafter as Bloom. Claim 11 is rejected under 35 U.S.C. 103(a) as unpatentable over Sweitzer in view of Bloom, and further in view of U.S. Patent 5,902,114 referred to hereafter as Erickson. Claims 14-15, 19, 35-38, and 41 were rejected under 35 U.S.C. 103(a) as unpatentable over Swietzer and Bloom, and further in view of U.S. Patent 6,341,959B1 referred to hereafter as Wen. The present application has been published as U.S. Patent Application Publication 2004/0253569A1, and references to the present application are in terms of this publication for the Examiner's convenience.

Claims 11, 26, 31, and 38 are canceled and claims 7, 10, 14, 20-22, 35, and 40-41 are amended in this response.

### **Rejection of Claims 1-18, 22-25, 28-30, and 34-39 under 35 U.S.C. 101**

Claims 1-18, 22-25, 28-30, and 34-39 were rejected as directed to non-statutory matter, e.g. they fail to produce a tangible effect. Applicants note that claims 1-6, 9, 16-

18, 34, and 39 were previously canceled, so rejections of those claims are moot.

Applicants again traverse this rejection as before but amend independent claims 7, 10, 22, and 35 in this response to refer to a user, to more clearly define the invention and to advance prosecution. All similarly rejected claims depend on these amended independent claims.

The specification describes several possible users, e.g. paragraph [0003] of the published patent application describes “educational assessors” as those who are known to design assessment items (e.g. examination questions), paragraph [0024] of the published patent application describes “respondents” as those who answer assessment items, paragraph [0025] describes users as “test subjects” and a “respondent”, and paragraphs [0067] and [0069] refer to a “user” as the creator of examination questions. The invention may output created assessment items for example via the graphical user interface shown in Figure 2; see also paragraph [0071] of the published patent application. Creation of assessment items for educational purposes such as student evaluation as taught and claimed is a practical real-world result or beneficial product.

#### **Rejection of Claims 7-8, 10-15, 22-26, 28-31, 33, and 35-38 under 35 U.S.C. 101**

Claims 7-8, 10-15, 22-26, 28-31, 33, and 35-38 were rejected as directed to non-statutory matter, e.g. they lack sufficient ties to a machine, article of manufacture, or a composition of matter. Applicants traverse this rejection but amend independent claims 7, 10, 22, and 35 in this response to refer to a computer-implemented method, to more clearly define the invention and to advance prosecution. All similarly rejected claims depend on

these independent claims. Creation of assessment items for educational purposes such as student evaluation as taught and claimed is a practical application as noted above.

### **Rejection of Claims under 35 U.S.C. 112, first paragraph**

All pending claims were rejected as lacking enablement. Applicants respectfully traverse this rejection and assert that a prima facie case of lack of enablement has not been properly made. Per MPEP 2164.04, in order to make a rejection, the examiner has the initial burden to establish a reasonable basis to question the enablement provided for the claimed invention. *In re Wright*, 999 F.2d 1557, 1562, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993).

The standard for determining whether the specification meets the enablement requirement is whether the experimentation needed to practice the invention undue or unreasonable. *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988). There are many factors to be considered when determining whether any necessary experimentation is “undue.” These factors include, but are not limited to the level of predictability in the art, the amount of direction provided by the inventor, the existence of working examples, and the quantity of experimentation needed to make or use the invention based on the content of the disclosure. *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988). Further, per MPEP 2164, for a claimed genus, representative examples together with a statement applicable to the genus as a whole will ordinarily be sufficient if one skilled in the art (in view of level of skill, state of the art and the information in the specification) would expect the claimed genus could be used in that manner without undue experimentation. Proof of enablement will be required for other

members of the claimed genus only where adequate reasons are advanced by the examiner to establish that a person skilled in the art could not use the genus as a whole without undue experimentation.

The “predictability” in the art refers to the ability of one skilled in the art to extrapolate the disclosed or known results to the claimed invention. If one skilled in the art can readily anticipate the effect of a change within the subject matter to which the claimed invention pertains, then there is predictability in the art. The invention deals with formulating mathematical word problems, which are widely known items in the art and not particularly unpredictable, but are instead highly systematic and have constrained vocabulary and syntax, and typically relate to the solution of a single algebraic equation with one dependent variable. See for example paragraphs [0037] and [0063] of the published patent application, for example, corresponding to paragraphs [0037] and [0057] of the as-filed specification respectively.

Per MPEP 2164.03, the amount of guidance or direction needed to enable the invention is inversely related to the amount of knowledge in the state of the art as well as the predictability in the art. *In re Fisher*, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970). The “amount of guidance or direction” refers to that information in the application, as originally filed, that teaches exactly how to make or use the invention. The more that is known in the prior art about the nature of the invention, how to make, and how to use the invention, and the more predictable the art is, the less information needs to be explicitly stated in the specification. A specification disclosure which contains a teaching of the manner and process of making and using an invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented must be

taken as being in compliance with the enablement requirement of 35 U.S.C. 112, first paragraph, unless there is a reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support. Detailed procedures for making and using the invention may not be necessary if the description of the invention itself is sufficient to permit those skilled in the art to make and use the invention.

In this case, the specification provides a thoroughly detailed description on the process of making and using the invention that is not limited to the exemplary mathematical word problem types that are then described in even more detail. As shown in Figure 1 for example, the invention employs a document structure generator to produce an abstract document specification, then uses a logical schema generator to produce a logical schema specification, and finally uses a sentence generator to create an item specification. This process is further described in paragraphs [0047] to [0058] of the published patent application, corresponding to paragraphs [0041] to [0052] of the as-filed specification. However, paragraphs [0036]-[0046] of the published specification, corresponding to paragraphs [0036] to [0040] of the as-filed specification, denote the more general use of semantic frames for organizing verbal content for analyzing word problems and isolating a series of variables with clear task-model relevance. The specification further notes in paragraphs [0039]-[0040] of the published application that in a “schematic logical representation of a mathematical word problem, lexical elements ... may be represented as abstract labels, which are filled in by choosing a semantic frame and substituting appropriate lexical and grammatical materials.” Variables and numerical values “may permit the schematic logical representation to abstract itself from language-specific details of verbal expression while still providing a detailed specification of the

content and the order in which it is to be presented. Each lexical element may represent a variable that ranges over a class of elements. The potential values for a lexical element may depend upon the selected semantic frame.”

Paragraphs [0040]-[0046] of the published application (paragraph [0040] as filed) describe the dimensions along which assessment items typically vary, and note that exemplary values for distance-rate-time assessment items are provided. The dimensions generally include the number of events, the semantic frame(s) associated with each event, the primary participants in each event, the identity of the primary participants, the secondary roles relevant to each event, and the identity of the secondary roles across events. The published specification further notes in paragraphs [0059]-[0060] (paragraphs [0053] to [0054] as filed) that the embodiment described in subsequent paragraphs “and in reference to Figures 2-6 is not meant to be limiting but merely exemplary of the generation of one type of an assessment item” and that generation of the assessment item may generally “be sub-divided into five tasks: assigning mental model structure variables, defining identity variables in the mental model structure, determining a task-relevant problem structure, describing a document format and structure, and determining language variations.” These tasks are not limited to the working example species provided, e.g. distance-rate-time problems and fuel efficiency problems. (Independent claims 7, 10, 20-22, 35, and 40-41 are amended in this response to also cover fuel efficiency problems, which are described in paragraph [0063] of the published patent application corresponding to paragraph [0057] of the as-filed application.)

Specific steps applicable to a genus of assessment items (e.g. mathematical word problems) are described. Paragraph [0061] (paragraph [0054] as filed) describes the

assignment of mental model structure variables. Paragraph [0062] describes defining the identity variables in the mental model structure. Paragraph [0063] describes the determination of a task-relevant problem structure, such as determining which variable is being determined for each event, the answer for each event, numeric values for the mathematical variables, and whether some information is provided in summary form. Paragraph [0064] covers the description of a document format and structure, that may include determining the format of the problem and the arrangement of content between the options and the stem. Paragraph [0065] notes that determining language variations may include selecting a language, selecting a sentence structure, selecting referent identification types, selecting detailed phrasing, determining whether quantities are in integer format, determining whether events are described in the present or past tense, etc. No undue experimentation is required by one of ordinary skill in the art to adapt these details of implementation to the particular types of mathematical word problems that are taught and claimed.

#### **Rejection of Claims under 35 U.S.C. 103(a)**

Claims 7-8, 10, 12-13, 20-26, 28-31, 33, and 40 stand rejected under 35 U.S.C. 103(a) as unpatentable over Sweitzer in view of Bloom. Claims 26 and 31 are canceled in this response to advance prosecution. Applicants respectfully traverse the remaining rejections as before, though all pending independent claims have been amended in this response.

Regarding paragraph 11 of the Office Action, Applicants note with some consternation that the automatic generation of mathematical word type assessment items

that only six paragraphs before in the Office Action was purportedly so mysterious a task that it was not enabled by the specification is now a mere arrangement of data after the Examiner has shifted ground. In reality, the claimed creation of assessment items is not simply equivalent to attaching a computer listing or other non-functional descriptive material as asserted, but indeed involves functional relationships with the underlying events, participants, and roles of participants provided in mathematical word problems as described in paragraphs [0040]-[0046] of the specification for example as previously mentioned. Document structure is analyzed and put into an abstract document specification defining a structure for an assessment item, with the document specification then being used to generate a logical schema specification that creates a more detailed specification for an assessment item. Finally, a sentence generator receives the logical schema specification and creates natural language for the assessment item based on the variables defined in the logical schema specification. See for example the abstract.

Claim 11 is similarly rejected as unpatentable over Sweitzer in view of Bloom, further in view of Erickson. Claim 11 is canceled in this response to advance prosecution.

Claims 14-15, 19, 35-38, and 41 are similarly rejected as unpatentable over Sweitzer in view of Bloom, further in view of Wen. Claim 19 was previously canceled, so rejection of that claim is moot. Claims 14, 35, and 41 are amended in this response to overcome the rejections. Claim 38 is canceled in this response. Claim 15 depends on amended claim 14, and claims 36-37 depend on amended claim 35.

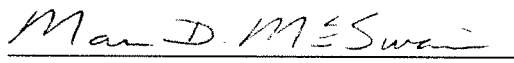


## Conclusion

Applicants respectfully submit that the application and the claims are in condition for allowance and request favorable consideration and the timely allowance of all pending claims. By the above amendments, Applicants submit that no new matter has been added to the application. If, for any reason, the application and claims are not in condition for allowance, or any additional information is required, the Examiner is invited to contact the undersigned at (650) 331-2048.

Should additional fees be due, the Commissioner is authorized to charge any additional fees which may be required or credit any overpayment of fees, to Deposit Account No. 05-0426.

Respectfully submitted,

  
Marc D. McSwain  
Reg. No. 44,929

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**CUSTOMER NO. 26565**  
**MAYER BROWN LLP**  
P.O. Box 2828  
Chicago, Illinois 60690-2828  
(650) 331-2048